# UNITED STATES PATENT AND TRADEMARK OFFICE

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/723,696 | 11/26/2003 | Andreas Menkhoff | 1890-0015 | 7838 |

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| EXAMINER |
|---|
| GHULAMALI, QUTBUDDIN |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2611 | |

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|---|---|
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) |
|---|---|---|
| | 10/723,696 | MENKHOFF, ANDREAS |
| | Examiner | Art Unit | |
| | Qutub Ghulamali | 2611 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *10 July 2007*.

2a)☐ This action is **FINAL**.     2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-23* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *19-23* is/are allowed.

6)☒ Claim(s) *1, 17 and 18* is/are rejected.

7)☒ Claim(s) *2-16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

## DETAILED ACTION

1.      This Office Action is in response to the remarks filed 07/10/2007.

2.      The applicant's amendment to the abstract of the disclosure submitted

07/10/2007, is acknowledged and accepted.

### *Response to Remarks*

3.      Applicant's remarks (see page 9-11), filed 07/10/2007, with respect to the

rejection of claims 1-18, under 35 U.S.C. 101, have been fully considered and after

further deliberation, the rejection has been withdrawn.  However, after further search

and review, claims 1, 17 and 18 are rejected based on art to follow.  The claim

objections noted under "claim Objections" were discussed with the applicant's

representative Mr. Russell E. Fowler, on 8/2/2007, and recorded herein under claim

objections.

### *Claim Objections*

4.      Claims 1, 4 are objected to because of the following informalities:

Claim 1(c), line 1 after "writing" -- the -- needs to be inserted.

Claim 18(b), line 1, "which can be" needs to be replaced with -- are --.

Claim 19(a), line 4, "resolved" needs to be replaced with -- calculated --.

Appropriate correction is required.

## *Claim Rejections - 35 USC § 103*

5.      The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

6.      Claims 1, 18 rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi

(USP 4,084,472).

Regarding claim 1, Niimi discloses a method for generating multiplier coefficients

comprising:

(a) performing recursive calculation of a multiplier set (MS) (respective partial tones or

set of particular frequencies) (col. 1, lines 25-59);

(c) writing multiplier coefficients (MC) (multiplying the respective recursion coefficients

pm and qm and storing M pairs of initial function value into a memory of the mixer in

accordance with the selected multiplier group (MG) (col. 1, lines 48-65; col. 2, lines 45-

59). However, as to claim limitation (b), the prior art figs. 1-3 discloses in the instant

application specification pages 2-3, wherein the 1:m mixer performs a frequency

conversion by multiplication in the time domain by a multiplication factor Mfi with a

particular (predetermined) word length WL that is increased until the desired accuracy

(minimum noise or error) is achieved.  As disclosed in the instant prior art fig. 2, in order

to achieve the desired accuracy i.e., high signal to noise value the word length is

increased increasing the storage space for the mixer coefficients.  Niimi, however,

discloses selecting partial tones, a multiplier 612 for multiplying the normalized partial

tone samples by the amplitude and the accumulator 613 for accumulating a

predetermined multiplier group of the outputs of the multiplier 612 to compose a tone

sample value, the amplitude memory 611 reads out a predetermined amplitude $a_m$

under the control of the output signal of the memory address control 622 in synchronism

with the operation of the wave sample memory and control circuit 602 so that a

predetermined pair of the sample value and the amplitude $a_m$ is multiplied in the

multiplier 612 to generate one sample value of the tone (col. 1, lines 35-59; col. 2, lines

45-54; col. 5, lines 35-41, 58-64; col. 7, lines 10-17; col. 8, lines 34-45). Therefore, it

would make an obvious choice to a person of skill in the art to use partial tone functions

to generate one sample value of reduced period as taught by Niimi in the instant prior

because it can provide greater signal accuracy with minimal signal error.

Regarding claim 18, Niimi discloses an apparatus comprising:

(a) a multiplier unit (612) for multiplying the digital input signal by multiplier coefficients

(col. 7, lines 10-15);

(b) a coefficient memory (602, 611) for storing multiplier coefficients which can be

applied to the multiplier unit by means of an address generator (col. 7, lines 10-20);and

(c) a connectable coefficient generator (603) for generating the multiplier coefficients by

recursive calculation (600). However, as to a number of multipliers is selected in

dependence on a predetermined signal/noise ratio of the mixer and corresponding

multipliers are written into memory, the prior art figs. 1-3 discloses in the instant

application specification pages 2-3, wherein the 1:m mixer performs a frequency

conversion by multiplication in the time domain by a multiplication factor Mfi with a

particular (predetermined) word length WL that is increased until the desired accuracy (minimum noise or error) is achieved. As disclosed in the instant prior art fig. 2, in order to achieve the desired accuracy i.e., high signal to noise value the word length is increased increasing the storage space for the mixer coefficients. Niimi, however, discloses selecting partial tones, a multiplier 612 for multiplying the normalized partial tone samples by the amplitude and the accumulator 613 for accumulating a predetermined multiplier group of the outputs of the multiplier 612 to compose a tone sample value, the amplitude memory 611 reads out a predetermined amplitude $a_m$ under the control of the output signal of the memory address control 622 in synchronism with the operation of the wave sample memory and control circuit 602 so that a corresponding predetermined pair of the sample value and the amplitude $a_m$ is multiplied in the multiplier 612 to generate one sample value of the tone (col. 1, lines 35-59; col. 2, lines 45-54; col. 5, lines 35-41, 58-64; col. 7, lines 10-17; col. 8, lines 34-45). Therefore, it would make an obvious choice to a person of skill in the art to use partial tone functions to generate one sample value of reduced period as taught by Niimi in the instant prior because it can provide greater signal accuracy with minimal signal error of a multiplier set from which a multiplier group consisting of a number of multipliers is selected in dependence on a predetermined signal/noise value of the mixer and corresponding results are written into the coefficient memory.

7.      Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi

(USP 4,084,472) in view of DesJardins et al (US Patent 6,219,815).

Regarding claim 17, Niimi discloses all limitations of the claim above except does

not explicitly disclose use of Horner coefficients to the result of multiplication of

multipliers.  However, DesJardins discloses implementation of Horner coefficients to the

result of the multiplication products by adding coefficient values $c_0$, $c_k$,

$c_{2k}$, etc. to the result of the multiplication products $c_k X^k$, $c_{2k}$

$X^{2k}$ $c_{3k} X^{3k}$, etc. (col. 15, lines 15-25).  It would have been obvious to a

person of ordinary skill in the art at the time the invention was made to use Horner

coefficients as taught by DesJardins in the system of Niimi because it can improve

coefficient evaluation by simultaneously evaluating a number of multipliers or other sub-

polynomials in the group.


### Reason for Allowance

8.      Claims 19-23 allowed.

9.      Claims 2-16 are objected to as being dependent upon a rejected base claim, but

would be allowable if rewritten in independent form including all of the limitations of the

base claim and any intervening claims.


10.     The following is an examiner's statement of reasons for allowance:

The prior art made of record in combination with other claimed limitations neither

teaches nor renders obvious the inclusion of limitation, the calculating circuit having a

number of dividing circuits for dividing the digital input signal applied to an input of the mixer, and a number of switchable adders/subtractors, wherein dividing factors of the dividing circuits are Homer coefficients of the calculating multipliers of the multiplier group, and adders/subtractors are controlled in dependence on a first control bit (SUB/ADD) read out of a memory of the mixer; a demultiplexer for switching through a zero value or the multipliers calculated by the calculating circuit in dependence on a second control bit (zero) read out of the memory; and (c) a sign circuit for outputting the positive or negative value switched through by the demultiplexer to an output of the mixer in dependence on a third control bit (SIGN) read out of the memory. Such limitations as recited in claim 19, is neither anticipated nor rendered obvious by the prior art made of record.

The claims 20-23, are allowed by virtue of their dependency to base claims highlighted above.


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


### *Contact Information*

11.    The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patents:

US Patent (USP 6,456,950) to El-Ghoroury et al.

US Pub. (2003/0061251) to White.

US Pub. (2006/0153576) to Bessios.

US Patent (00RE39385E) to Brightman et al.

US Patent (5,539,357) to Rumreich.

US Patent (6,856,925) to Muhammad et al.

US Patent (4,317,206) to Nossen.

US Patent (4,021,653) to Sharp et al.

Publication:

X. Liu et al "Recursive Calculation of the Two-Dimensional Maximum Likelihood

Position Estimate for a Scintillation Camera", IEEE, Transaction on Nuclear Science,

vol. 37, No 2, April 1990.


12.     Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Qutub Ghulamali whose telephone number is (571) 272-

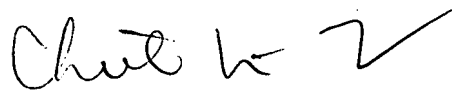3014. The examiner can normally be reached on Monday-Friday, 7:00AM - 4:30PM.

     If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Chieh M. Fan can be reached on (571) 272-3042. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

QG.
August 14, 2007.

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER